

WHAT IS CLAIMED IS:

1. A piston for an internal combustion engine, comprising:
a piston body having an airtight cavity vertically elongated therein; and
a heat transfer material partially filling the airtight cavity.
- 5 2. The piston of claim 1, wherein the heat transferring material is a fluid.
3. The piston of claim 2, wherein the fluid satisfies a thermal conductivity criterion, the thermal conductivity criterion being that a thermal conductivity of the fluid is in a conductivity range of 0.1 to 200 W/m-K.
- 10 4. The piston of claim 2, wherein the fluid satisfies a density criterion, the density criterion being that the density of the fluid is in the range of 500 to 30,000 Kg/m³.
5. The piston of claim 2, wherein the fluid satisfies a heat capacity criterion, the heat capacity condition being that a heat capacity of the fluid is in a heat capacity range of from 0.1 to 10 KJ/KgK.
- 15 6. The piston of claim 2, wherein the fluid satisfies a plurality of criteria among a thermal conductivity criterion, a density criterion, and a heat capacity criterion, wherein:
the thermal conductivity criterion is that thermal conductivity of the fluid is in the range of 0.1 to 200 W/m-K;
20 the density criterion is that the density of the fluid is in the range of 500 to 30,000 Kg/m³; and
the heat capacity criterion is that heat capacity of the fluid is in the range of 0.1 to 10 KJ/Kg-K.
7. The piston of claim 6, wherein the fluid comprises at least one material among mercury, potassium, sodium, a sodium-potassium compound, and a bismuth-lead compound.

8. The piston of claim 1, wherein:
the piston body comprises a ring mounting groove for mounting a piston ring; and
an upper end of the cavity is elongated above the mounting groove.
- 5 9. The piston of claim 1, wherein:
the piston body comprises a concave portion formed on a head surface thereof; and
an upper end of the cavity is elongated above a bottom of the concave portion.
- 10 10. The piston of claim 1, wherein:
the piston body comprises a boss portion for mounting a piston pin; and a lower end of the cavity is elongated below the boss portion.
- 15 11. The piston of claim 8, wherein:
the piston body comprises a boss portion for mounting a piston pin; and a lower end of the cavity is elongated below the boss portion.
12. The piston of claim 9, wherein
the piston body comprises a boss portion for mounting a piston pin; and a lower end of the cavity is elongated below the boss portion.
13. The piston of claim 1, wherein the heat transfer material fills less than
20 50% of the volume of the airtight cavity.
14. The piston of claim 13, wherein the heat transfer material fills about 20% of the volume of the airtight cavity.